

WHAT IS CLAIMED IS:

1. An optical transmitter, comprising an optical modulation processing unit that includes:
 - a signal carrier-suppressed pulse modulating unit that performs signal carrier-suppressed pulse modulation on a light source signal to thereby create a carrier-suppressed-return-to-zero signal;
 - a phase modulating unit that performs phase modulation on a data signal based on the carrier-suppressed-return-to-zero signal to thereby convert the data signal into a phase-modulated signal; and
- 10 an optical filtering unit that filters out redundant frequency components included in the phase-modulated signal.
2. The optical transmitter according to claim 1, wherein the signal carrier-suppressed pulse modulating unit performs the signal carrier-suppressed pulse modulation based on a clock signal of a frequency that is determined by a signal frequency of the data signal, and creates the carrier-suppressed-return-to-zero signal such that peaks of an optical frequency spectrum are separated from each other by the signal frequency; and
- 15 the optical filtering unit filters out all frequency components that fall outside a frequency band determined by the signal frequency.
3. The optical transmitter according to claim 1, wherein the optical modulation processing unit is provided in plurality and each optical modulation processing unit performs modulation on each of a plurality
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of data signals and creates an optical output signal, and the optical transmitter further comprises:

an optical combining unit that wavelength-multiplexes the optical output signals output from the optical modulation processing units.

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4. The optical transmitter according to claim 1, wherein the optical modulation processing unit further includes a differential coding unit that performs differential-coding on the data signal.
- 10 5. The optical transmitter according to claim 1, wherein the signal carrier-suppressed pulse modulating unit is a Mach-Zender interferometer optical modulator.

- 15 6. An optical transmitter, comprising an optical modulation processing unit that includes:
 - a phase modulating unit that performs phase modulation on a data signal to thereby convert the data signal into a phase-modulated signal;
 - a signal carrier-suppressed pulse modulating unit that performs signal carrier-suppressed pulse modulation on the phase-modulated signal to thereby convert the phase-modulated signal into a phase modulated carrier-suppressed-return-to-zero signal; and
 - 20 an optical filtering unit that filters out redundant frequency components included in the phase modulated carrier-suppressed-return-to-zero signal.
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7. The optical transmitter according to claim 6, wherein
the signal carrier-suppressed pulse modulating unit performs the
signal carrier-suppressed pulse modulation based on a clock signal of a
frequency that is determined by a signal frequency of the data signal,
5 and creates the carrier-suppressed-return-to-zero signal such that
peaks of an optical frequency spectrum are separated from each other
by the signal frequency; and
the optical filtering unit filters out all frequency components that
fall outside a frequency band determined by the signal frequency.

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8. The optical transmitter according to claim 6, wherein the optical
modulation processing unit is provided in plurality and each optical
modulation processing unit performs modulation on each of a plurality
of data signals and creates an optical output signal, and the optical
transmitter further comprises:
an optical combining unit that wavelength-multiplexes the optical
output signals output from the optical modulation processing units..

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9. The optical transmitter according to claim 6, wherein the optical
modulation processing unit further includes a differential coding unit
that performs differential-coding on the data signal.

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10. The optical transmitter according to claim 6, wherein the signal
carrier-suppressed pulse modulating unit is a Mach-Zender
interferometer optical modulator.

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